

the **SINCLAIR/TIMEX USERS MAGAZINE**

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Number 6



- Inside -

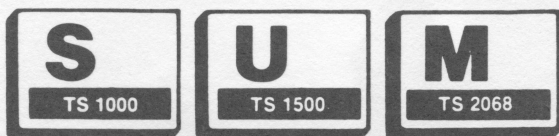
Spectrum Plus Review!

A Complete Graphics Program for the 2068
Report on the Summer Consumer Electronics Show

Gainesville TUG Meetings

The Gainesville Timex Users Group has changed its meeting time and place. Meetings are now the third **Tuesday** of each month in the northeast classroom area of the **Crossroads Church** building located at 2720 SW Second Avenue in Gainesville. Meeting time is still 7:00 p.m. These facilities are somewhat larger than what we have used in the past and can accommodate a number of computer set-ups.

Anyone needing more information about the next meeting can call Joe Williamson at 904/462-1086 or Richard Cravy at 904/378-9000 for more information.



THE SINCLAIR/TIMEX USERS MAGAZINE

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BACK ISSUES OF SUM AVAILABLE

The following back issues of **SUM Magazine** are available for purchase while the supply lasts. Back issues before this are no longer available except on a more expensive "photocopied" basis. To order, use or make a copy of the order form inside the back cover of this issue, check the appropriate square(s) and mail with a check to the address listed there. By popular request we have listed a **partial** "Table of Contents" for each issue.

January, 1985 — TS-2068 Printer Interface Hardware Project; Beginner's Programming, Part I; Sears RGB Monitor with TS-2068; More on Spectrum software running on modified TS-2068. 10 pages.

February, 1985 — February Vendor Report; TS-2068 Printer Interface, Part II; Beginner's Programming, Part II; Tasword II Improvements. 12 pages.

March, 1985 — Spectrum Plus Now in U.S.; TS-2068 Printer Interface, Part III; A & J Microdrive Review; SPECTAX85 Review; Beginner's Programming, Part III. 16 pages.

April, 1985 — Timex Portugal Coming; ZX Microdrive Interface for 2068 Announced by EMC; Tasword II on the A & J Microdrive; User-Defined Graphics for the TS-1000, Part I; Beginner's Programming, Part IV; Rocket Man Review; Using Aerco Interface with Spectrum Rom. 16 pages.

May, 1985 Special Issue — Publisher's Statement; Portuguese 2068 Computer and Disk Drive System Hands-On Evaluation; Rotronics Wafadrive Review; Convert Your TV into a Monitor; Pro/File 2068 Review; Zaxxon Review; User-Defined Graphics for the TS-1000, Concluded. 28 pages.

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The Consumer Electronics Show

— A First-Hand Report —

Twice each year the American consumer electronics industry has a giant show in which manufacturers from here and abroad show their new and upcoming products to their dealers and the press. In recent years over 100,000 people have been in attendance at these shows.

The most recent CES was held in early June in Chicago. SUM attended the show in hopes of getting a better feel for the industry, of seeing Sinclair, and of making contacts with possible suppliers of Timex and Sinclair products. We were only partly successful in our goals.

First, several vendors claimed to have seen members of the Sinclair U.S. team but Sinclair had no booth, and apparently was not showing the QL or any other products. The only exception was the new little Sinclair electric car which was seen by some and apparently was the only visible presence of Sinclair.

Second, the show itself was simply awesome! Around 2,000 manufacturers were showing their wares to over 100,000 dealers and the press. They ranged from small two-man manufacturers from Hong Kong to the giants of the video and audio industry who had exhibits larger than most audio/video stores. Of course our special interest was in the separate McCormick Hall where there were three floors of computer and related products.

The computer section of the show was the smallest it has been in five years we were told. IBM, Apple, and Kaypro were not there, but Commodore had a huge booth and at the last minute Atari set up a display (though we never could find it). Obviously Commodore is counting heavily on their new 128 machine as they were showing almost nothing else; there was no hint of any "Macintosh-type" machine.

Software companies seemed to have been in abundance. Most of what was being shown were games for the Commodore. However, a very large Batteries Included booth featured more serious software for Atari and Apple as well as Commodore. Two fascinating programs which would be great on the Timex machines were "The Newsroom" by

Springboard and "Print Shop" by Brodurbund. I doubt that either will be exported to England for the Spectrum. The Batteries Included software package of word processor, filer, and graphics would be the most powerful software available if converted to Timex/Sinclair machines yet listed for only \$50. I am planning on writing to some of these companies and urging them to consider the Timex and Sinclair markets and hope other TS owners will do the same.



Amstrad 128K Computer with built-in disk drive and accompanying color monitor.

The most interesting computer from our vantage point was the Amstrad 128 from England. It is scheduled to be released in September here. It was very much like a Spectrum with a different keyboard and a built-in 3" disk drive like the one we reviewed in the May issue. Software is not compatible with the Spectrum, of course. But its graphics were impressive and it is expected to be sold as a package--128k computer with parallel interface and disk drive, a color monitor, and a word processing package for \$795.

Products for the Timex/Sinclair line were non-existent with but one exception. We did visit with Linda Fisher of "Computer Shopper" which runs TS articles each month. Also, Softsync was in attendance--a company begun by a fashion model with one software program for the TS-1000 and which



Sue Currier of Softsync, one of the first American companies which entered the Timex market.

has now moved on to a range of Commodore and Apple software. Sue Currier, Softsync's owner, was very interested in what is going on in the TS market today, but gave no indication that her company would return to it. Activision had a large booth advertising their games software. A brochure they were distributing listed several games for the Spectrum, but inquiry revealed that they were "only for the international market".

Now for the good news! Tucked away in a corner of the great hall was a very small booth which we almost missed. In it were a Sinclair QL computer running software off a disk drive along with a Spectrum Plus.



Joe Williamson (left) and AB Pandaal, Managing Director of Kempston, in front of the modest Kempston booth. A Sinclair QL and Spectrum Plus are visible in the background.

It was the booth of Kempston Micro Electronics, one of the largest suppliers of hardware peripherals for the Spectrum in England. Kempston's director, AB Pandaal

was there all alone, and seemed to be as glad to see us as we were to see him! He had not found much interest in their products until we arrived. Over an hour of conversation informed him of the improving market here in the U.S. and he indicated that Kempston would love to adapt their products for the 2068 and sell over here. Their product line is extensive and constantly growing with parallel and serial interfaces for the Spectrum and QL, joystick interfaces for the Spectrum, and a disk drive interface for the QL.

Watching the QL run was fascinating. I was not prepared for the minute size of the microdrive cartridges or the speed and smoothness of the graphics. Pandaal was actually running an American version of the QL supplied to him by Sinclair. With the addition of the Kempston interface and a disk drive, it certainly was a desirable package.

Our overall impression at CES this year is that the whole computer market is "hurting" right now with some notable exceptions. Nothing new we saw made us want to trade in our 2068s and Spectrums. The failure of Sinclair to show product was disappointing and hard to understand with the QL going on sale in the U.S. the same month as the show.

-- Richard Cravy

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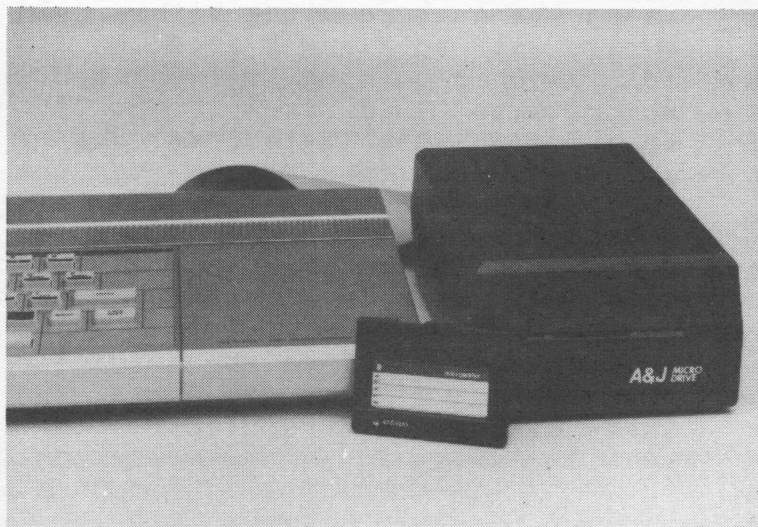
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2068 Graphics for the Beginner

Having purchased a 2068 computer, I soon found that I would have to know at least a basic knowledge of trigonometry if I were going to make graphics to any degree. Not having a working knowledge of trigonometry, nor a desire to go back to night school to obtain it, I decided to obtain a book on basic trigonometry and try and learn it myself.

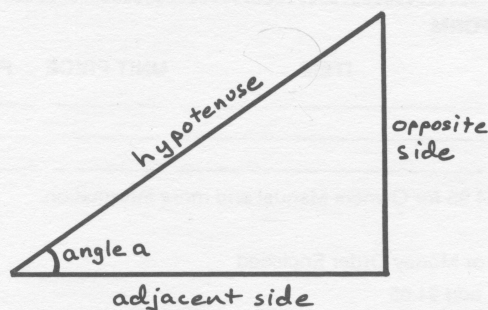
Having the book, and the computer, and the desire to learn, the next logical step was to use the computer to help me learn. The results of this endeavor are given in this article. The article is for others, who like myself, desire to learn.

The Trigonometry: Trigonometric functions are based on a circle of 360°. There are three basic functions:

$$\text{SIN } a = \frac{\text{Side opposite}}{\text{Hypotenuse}}$$

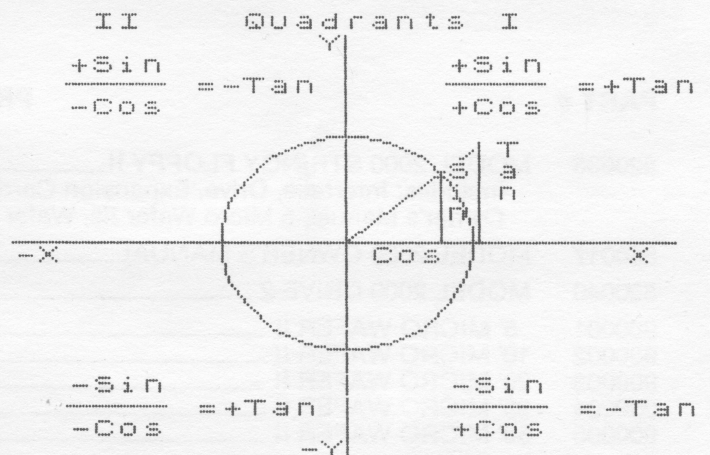
$$\text{COSINE } a = \frac{\text{Side adjacent}}{\text{Hypotenuse}}$$

$$\text{TANGENT } a = \frac{\text{Side opposite}}{\text{Side adjacent}}$$



Simply stated, these are the ratios of one side to another with respect to the given angle, a . How do these affect us when doing graphics? Inside the computer there is a number system used to tell the computer where to plot and draw the

lines. These locations are found by using the numbers along with a grid system with an X and Y axis. An aid for remembering the direction in which these lines run is: Why (Y) up and down when (X) across? The Y axis runs from the bottom to the top and the X axis runs from left to right on the screen. A third axis is called the Z axis. It runs into the screen in a line of sight fashion. The point where these lines cross is called the origin or vertex. The Z axis is used for three dimensional graphics.



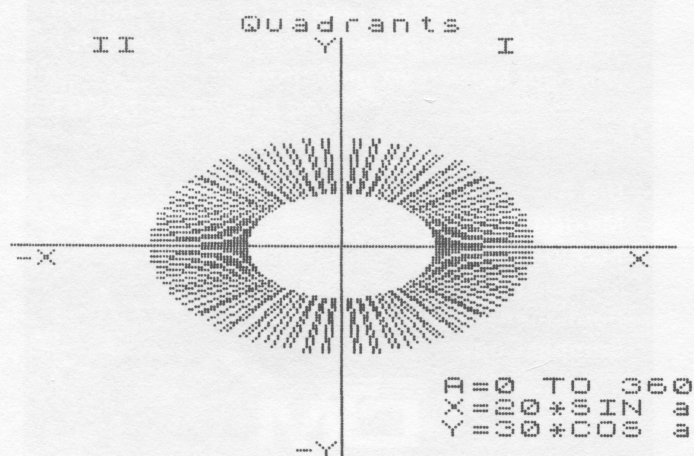
So what is the point of all this? Bear with us a little longer and you will start to see what this is all about. We now introduce some more terms.

The number 3.14159 is known as PI (pie). The RADIAN comes from $180^\circ/\text{PI}$. This gives us 57.3° . Going a step further we have $\text{PI}/180^\circ$. This is .01745. That is to say, there is .01745 of a radian in 1° . Your 2068 uses this system when calculating parts of a circle.

Dividing 360° by 57.3° we get 6.28, or 2PI . There are two pi radians in 360° , which is a circle. The circumference of a circle is found by: $C=2*\text{PI}*r$ where r is the radius of the circle. Again it is a

ratio. The circumference is 2π times longer than the radius. The ratio of the circumference to the diameter is π . Wow, did we need all that? Aren't you glad this is not a trig. class?

Let us go back to the radius for a minute. If we extend a line outward from the vertex on the X axis, say to the right side, and then we begin to rotate this line counter-clockwise, Each time the line moves through a 90° section of the circle, it is passing through what is called a quadrant. The first 90° is the first quadrant. As it rotates into the next 90° (on its way to 180°) it is entering the second quadrant. When it has passed through the third and fourth quadrant, it is back to where it started from, a full 360° .



Now type the program into your computer and RUN. When the menu appears on the screen, enter 1. This will bring up the graph with the trig. functions on it. Notice that the signs of the trig functions change as the line is rotated through the quadrants. This is the effect of the line as it passes through the quadrants. This must be taken into account when designing graphics. If you ignore the sign changes, you would have a line going in the wrong direction at the wrong time!

After saving the main program, Enter this program into the computer:

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```

5 FOR A=0 TO 360 STEP 3
10 LET X=SIN(A*PI/180)
15 LET Y=COS(A*PI/180)
20 PLOT 128,99:DRAW X,Y
25 NEXT A

```

Did you run it? if so, you saw what looked like a small square on the screen. Why was it so small? To see why, we will pick a number out of the 0° TO 360°, say 30°. The SIN of 30° is 0.5. Taking the COS of 30°, we get 0.866. Neither one of these numbers are very large and they have not traveled very far, only 30°. Also they have not moved very far from the vertex. Then we have another factor to consider, that of the step value 3. Therefore, our line is drawn only once every 3°. If you happen to know the SIN or the COS value of a number, you can find the angle by reversing the trig. function on a calculator.

What we need is a way to magnify the drawing so that we can view it easier. How do we do this? Change line 10 and 15 to read:

```

10 LET X=30*SIN(A*PI/180)
15 LET Y=15*COS(A*PI/180)

```

Now run it. How about that? A fancy arc! This is what we thought was a square before. How would you draw a circle without using the circle command? Now what if you want to draw in just the first quadrant? Back to the magic A. Change line 10 to read:

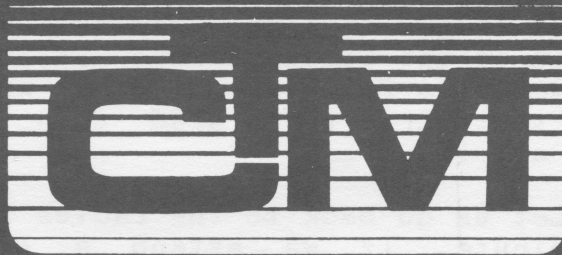
```

5 FOR A=90 TO 270

```

Try it. As you can see, the multiplier values of 30 and 15 caused the SIN and COS to be shifted to an amount great enough to see the drawing clearly. What we have here is a way to shift the size of the drawing up or down in size. Now that we know how to do that, how do we shift the drawing on its axis, that is tilt it?

If you have followed closely what has been covered so far, you will have noticed that the SIN and



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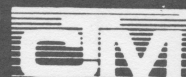
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COS are also a ratio to each other. As one is affected, so is the other. That is as long as they share the same variable.

Remember the quadrants and the rotating line? Load the main program again and bring up the graph. Study the graph until you understand how these functions work. Watch the sign changes!

Now load the next program and watch what happens to the figure:

```
5 PLOT 0,88: DRAW 255,0: PLOT 1
28,0: DRAW 0,175
10 FOR A=0 TO 360 STEP 5
15 LET X=25*SIN (A*PI/180)
20 LET Y=75*COS (A*PI/180)
25 PLOT 129,88: DRAW X,Y
30 NEXT A
```

When you run the program you will see that the figure appears to have turned on its axis. We told the computer to increase the COS value by an amount in which the ratio of the SIN to the COS makes it look like it turned. We have the trigonometry working for us in much the same way an artist does his pencil, with the screen being the paper.

We have learned how to magnify our views by simply changing the value of the SIN and COS by using a multiplier. By changing the value of the variable, we were able to start the drawing at a different quadrant. Try various combinations of functions.

Just think of the advanced graphic capabilities in this machine which we haven't even covered here. There will be very little that you will not be able to do with it.

We need to mention the third function, the tangent. On the graph of the main program is a line running perpendicular to the X axis and at the outer edge of the circumference, this is the tangent. To see an affect of the tangent, change line 15 to read:

```
15 LET X=25*SIN (A*PI/180)*TAN
A/10
```

You can create some unusual designs using this function as well. Type in the following:

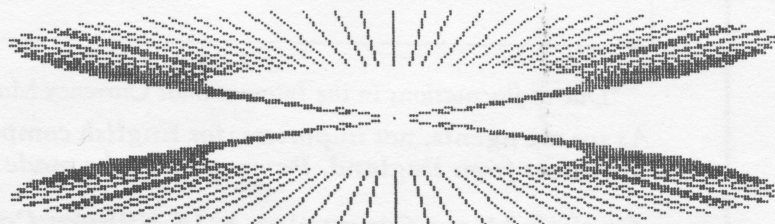
```
5 PLOT 0,88: DRAW 255,0: PLOT
128,0: DRAW 0,175
10 FOR A=0 TO 360 STEP 5
15 LET X=25*SIN (A*PI/180)
20 LET Y=-COS (A*PI/180)*2
25 LET Z=10*TAN (A*PI/3)
30 PLOT 129,88: DRAW X,Y
35 PLOT 50,88: DRAW X,Y,Z
40 NEXT A
```

Now try taking some of the examples we have given and use your imagination to see what you might do with them. Try removing the DRAW statements and leaving just the plots. Change values, sign, etc. You be the artist.

We have tried to present some of the things that we have learned along the way. It is hoped that others will be encouraged to experiment on their own. There are unlimited possibilities with this machine. The graphics are all there, all you have to do is get them out.

You might get a book on trigonometry and learn more about it. It can be a lot of fun trying to draw these graphics. (Ed's note: Some of the best designs I came up with was in the "Dividing PI by Degrees" section which starts at line 500. Try using 245 & 90, 245 & 45, and 120 & 240. To watch the graph build even more, change the 360 in line 510 to something alot higher like 720.)

Andy Centek Jr.
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(The master program listing is found beginning on page 12)

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Master Program Listing to accompany "2068 Graphics for the Beginner"

```

5 REM ** Graphics and trig **
10 PAPER 0: INK 7: BORDER 5
11 GO SUB 200
12 GO SUB 1000
14 PRINT AT 2.5;"Trig. affects
on graphics."
15 PRINT "Showing plots of tri
g functions in relation to qua
rants."
20 CLS
22 PRINT "1-Graph with trig. f
unctions labeled on graph."
23 PRINT
24 PRINT "2-Sample program."
25 PRINT
26 PRINT "3-Run a program."
27 PRINT
29 PRINT
31 INPUT n
32 IF n=1 THEN GO TO 40
33 IF n=2 THEN GO SUB 300
35 IF n=3 THEN GO TO 399
36 GO TO 399
39 STOP
40 CLS
44 PLOT 0,88: DRAW 255,0
45 PLOT 128,0: DRAW 0,166
50 PRINT AT 0,12;"Quadrants"
55 PRINT AT 0,6;"1:AT 0,22;"
I:AT 21,6;"11:AT 21,22;"IV"
57 PRINT AT 2,5;"Sin:AT 3,5;"
3 UDG a"s:AT 4,5;"Cos:AT 3,5;"
10;"Tan"
58 PRINT AT 2,20;"Sin:AT 3,2
0;"3 UDG a"s:AT 3,25;"Tan:AT
T 4,20;"Cos"
59 PRINT AT 17,5;"Sin:AT 18,
5;"3 UDG a"s:AT 18,10;"Tan";
AT 19,5;"Cos"
60 PRINT AT 17,20;"Sin:AT 18
,20;"3 UDG a"s:AT 18,25;"Tan
";AT 19,20;"Cos"
61 PRINT AT 20,14;"Y"
62 PRINT AT 11,0;"X:AT 11,30
;"X"
63 PRINT AT 1,15;"Y"
64 PLOT 128,88: DRAW 40,35: PL
OT 128,88: DRAW 0,27
65 PRINT AT 7,20;"S:AT 8,20;"
I:AT 9,20;"n"
66 PLOT 128,88: DRAW 42,0: DRA
W 0,38
67 PRINT AT 6,22;"T:AT 7,22;"
a:AT 8,22;"n"
68 PRINT AT 11,17;"Cos"
69 CIRCLE 128,88,40
70 BEEP .01,.1: BEEP .05,.1

97 INPUT "Enter -m- (return to
Menu only):";$
98 IF a$<>"m" THEN GO TO 97
100 GO TO 20
200 FOR I=0 TO 7
201 PRINT AT 0,4;"Coming Up --G
RAPHS"
202 PRINT INVERSE 1;AT 19,0;"
I AM COMPUTING-PLEASE WAIT!"
205 BRIGHT 1: PAPER 1: INK 7: B
ORDER 0
210 FOR n=0 TO 40
215 FOR a=0 TO 65
220 NEXT I
225 LET Y=2-(a*SIN (n/3*PI))
230 LET C=10-(a*COS (n/6*PI))
235 PLOT 120,90: DRAW Y,C
240 NEXT n
245 NEXT a
247 FOR x=10 TO 0 STEP -1: BEEP
.01,x: PAUSE 5: NEXT x
250 PRINT INVERSE 1;AT 19,0;"
Andy Centek,Jr."
265 PRINT AT 1,5;"*:AT 5,3;"*
;AT 10,25;"*:AT 20,7;"*"
280 PAUSE 300: CLS : RETURN
299 STOP
300 REM *** Draw Graph ***
305 CLS
310 PLOT 0,88: DRAW 255,0
315 PLOT 128,0: DRAW 0,166
320 PRINT AT 0,12;"Quadrants"
325 PRINT AT 1,6;"1:AT 1,22;"
I:AT 21,6;"11:AT 21,22;"IV"
330 PRINT AT 20,14;"Y:AT 11,0
;"X:AT 11,30;"X"
335 PRINT AT 1,15;"Y"
339 PAUSE 100
340 FOR a=0 TO 360 STEP 3
342 BEEP .005,.005
345 LET X=30*SIN (a*PI/180)
350 LET Y=20*COS (a*PI/180)
355 PLOT 128+X,88+Y: DRAW X,Y
365 PRINT AT 17,20;"A=0 TO 360"
;AT 18,20;"X=20*SIN a";AT 19,20
;"Y=30*COS a"
360 NEXT a
365 INPUT "Return to Menu only.
Enter -m-";$
370 IF $="m" THEN GO TO 20
375 IF $<>"m" THEN GO TO 365
398 STOP
399 CLS
400 REM ** Main Program **
401 PRINT "Showing the effects
of the
Sin and Cos."
402 PAUSE 150
403 INPUT "Chose multipliers. 0
ne number,";"for the SIN (1-35)a
nd one for the COS (1 TO 30)"
;,$C
404 PAPER 1: INK 7: BORDER 5
405 CLS
406 GO TO 460
410 FOR a=0 TO 360 STEP 3
420 LET Y=S*SIN (a*PI/180)
430 LET X=C*COS (a*PI/180)
435 PLOT 128+X,88+Y: DRAW X,Y
446 IF a>=360 THEN GO TO 456
455 NEXT a
456 INPUT "Another or a new pro
gram (a or n) ?";$
457 IF $="a" THEN CLS : GO TO
400
458 IF $="n" THEN GO TO 500
459 IF $<>"a" OR $<>"n" THEN
GO TO 456
460 REM ** Draw Graph **
461 CLS
462 BEEP .05,.05
465 PLOT 0,88: DRAW 255,0
470 PLOT 128,0: DRAW 0,166
475 PRINT AT 0,12;"Quadrants"
480 PRINT AT 1,6;"1:AT 1,22;"
I:AT 21,6;"11:AT 21,22;"IV"
485 PRINT AT 20,14;"Y:AT 11,0
;"X:AT 11,30;"X"
490 PRINT AT 1,15;"Y"
492 PRINT AT 18,25;"Sin:AT 1
9,25;"Cos"
495 GO TO 410
500 REM ** Dividing PI by degre
es **
505 CLS
507 INPUT "Dividing PI by degre
es (0 to 360). Input degrees for
SIN and COS (1-2) ?";d1,d2
508 BEEP .05,.05: BEEP .05,.05
510 FOR a=0 TO 360 STEP 3
525 LET X=60*SIN (a*PI/d1)
530 LET Y=40*COS (a*PI/d2)
535 PLOT 128+X,88+Y: DRAW X,Y
545 NEXT a
550 INPUT "Run another or next
program ? (a or n)";$
556 IF $="a" THEN GO TO 500
560 IF $="n" THEN GO TO 600
600 CLS
605 REM ** Plot over function *
*
606 PRINT AT 2,2;"Using the dra
w over function."
610: INPUT "Values for SIN and
COS. Mx. SIN value 120. Mx. CO
S value 80. (1-2) ?";$C
611 IF $120 OR $>80 THEN FLAS
H 1: PRINT "To Big": PAUSE 100:
FLASH 0: GO TO 610
612 CLS
613 PRINT AT 19,35;"*SIN ";AT
20,35;"*COS "
615 FOR a=0 TO 360 STEP 8
620 LET X=S*SIN (a*PI/180)
625 LET Y=C*COS (a*PI/180)
630 PLOT 128,88: DRAW OVER 1;X
,Y
632 POKE 23692,5
635 NEXT a
636 PRINT INVERSE 1;AT 18,0;"
You may change the step value
at line 615 for different
affects. Press any key to
continue."
637 PAUSE 0:
640 INPUT "Another or back to m
enu (a or m) ?";$
645 IF $="a" THEN GO TO 610
655 IF $="m" THEN GO TO 20
660 SAVE "trig" LINE 5
1000 REM GET LINE USR A
1002 FOR n=0 TO 8
1004 READ a: IF a=99 THEN RETUR
N
1006 POKE USR "a",n,a
1008 NEXT n
1010 DATA 0,0,0,255,0,0,0,0,99

```


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Free Tech-Draw Software (\$19.95 Value) with purchase of a Zebra Graphics Tablet at \$89.95. Expires AUGUST 30th, 1985.

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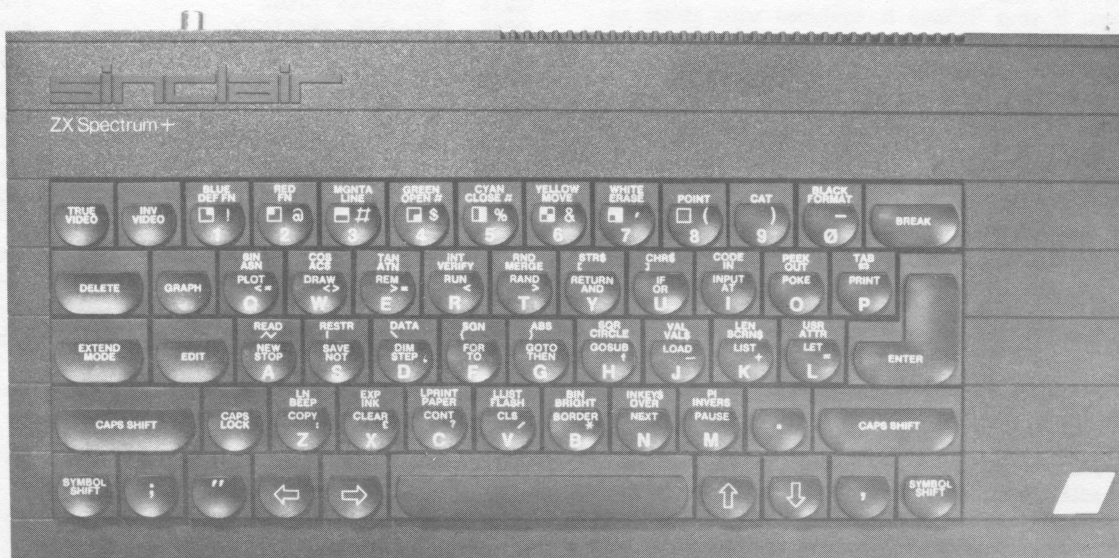
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A Review of the Sinclair Spectrum Plus



The latest home computer from Sinclair is the ZX Spectrum+. What sets this computer ahead of the other Spectrums is the larger keyboard with extra dedicated keys. The Spectrum+ looks a lot like the QL small business computer but with a few less keys and no microdrives attached to the side.

The keyboard itself has more of the feel of a "large" keyboard, more so than the 2068 does. Pull-out legs are also provided in the rear to prop up the keyboard at an angle for more comfortable use. A reset button is located on the left side to get out of any crash situation or to start all over.

Dedicated keys include the arrow keys, the period and comma, quotation mark, semicolon, true and inverse video, single key extended mode, caps lock, graphics, edit, delete, break and an extra symbol shift key on the left side. One thing that annoyed me was the placement of the break key which is just to the right of the zero key. Most computers have the delete or backspace key there. Why change it?

The connections on the back are in the same locations as on previous Spectrums. In fact, the circuit board inside is the same as well, so that Spectrum owners can now buy upgrade kits to fit old Spectrums into this new case. To carry this a little

farther, you could even fit the TS 1500 circuit board inside this case and it would work as well, even with the keyboard! Of course the key words don't all line up, but the alphanumeric are all correct.

On the circuit board itself, none of the integrated chips are socketed except for one of the two ULA chips. Suprisingly, there are more IC chips than in the 2068, on a much smaller board.

When you get one of these things, you need to supply your own power supply. The power supply that came with the TS-1000 and 1500 works nice as long as you either change the plug at the end of the cord to a coaxial type as found on the 2068 with center negative, or you can mount a new socket in the computer itself to match the plug that already exists on the power supply cord. If you don't have a power supply sitting around, any of the replacement Atari game power supplies work just fine on this or any of the ZX 81/TS-1000 or TS-1500s.

Because the Spectrum is designed to work on the PAL type TV system, you need to supply your own RF cable to connect to a TV with a UHF tuner. The channel for viewing is around 36; be prepared to adjust the vertical hold on your set. My Spectrum gives me a very good picture with

A fast reliable dual-drive storage system

Integrated System

The Wafadrive is a complete system which contains the micro interface, two 128K drives, RS232 and Centronics ports, all in one attractively-styled, compact unit. There is a minimum of connecting leads and no extra boxes to clutter the desk top. Like the majority of professional systems, the units are dual drive. This offers the optimum balance between system flexibility and cost. Built-in serial and parallel interfaces allow the direct connection of just about any popular printer.

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little to no interference (squiggly lines, grid pattern).

There is no monitor jack on the rear of the computer, but one can easily be added. I used a chassis-mount RCA type connector and drilled a hole next to the RF jack so that the new jack will fill in the space between the modulator and the rear leg assembly. Connect the center pin to the nearest wire leading into the modulator (goes into the side center of the modulator). The outer ring goes to the case of the modulator. This alone gives a good picture on most monitors. To get a little brighter, sharper picture, locate the 2.2K (red, red, red) ohm resistor which is second from the rear in a row of twelve resistors just in front of the left side of the modulator and jump a 4.7K (yellow, violet, red) ohm resistor across it. If you get any tearing of the picture, use a higher value resistor.

Color is another story. Probably the biggest difference between the TV standard used here (NTSC) and the one used there (PAL) is the way color is added to the

picture. The simplest way around it (if you need color) is to buy an RGB interface for the Spectrum and use it with an RGB monitor. The poor man's way is to change out the color burst crystal. The computer comes with a 4.43 MHZ crystal which is the frequency used in the PAL TV system. With NTSC, the frequency is 3.579545 MHZ, so run down to your local electronics parts store and pick one up (Radio Shack sells them for around \$1) and swap crystals out.

Doing this, I get a beautiful blue and yellow, but other colors are just so-so. On older Spectrums, all you needed to do was change out the resistor and capacitor values in the color circuit to match what is used in the 2068. Unfortunately, this new version of the Spectrum marked issue 6A uses a different video processor (SN94459) and I have yet to get a schematic for it, so we'll have to live with the colors the way they are for now.

The second crystal can be changed out to provide a more stable picture. This crystal is 14MHZ, whereas the 2068 uses a 14.112MHZ crystal. Good luck finding this

other crystal unless you happen to have a junker 2068 laying around to pull parts from.

I enjoy using this new Spectrum - particularly the keyboard. All Spectrum software runs on it with no problem, giving you access to over 5,000 programs.

Even now, Spectrums are one of the leading home computers in England, giving Commodore, Atari, and others fierce competition. The Spectrum+ is available now through English Micro Connection in Newport, Rhode Island.

--Joe Williamson

Additional Notes on the Spectrum Plus

While Joe was busy checking out the "mechanics" of the Spectrum Plus, I was looking it over in other ways.

First, the Spectrum Plus comes with an excellent manual printed in full color. Only 80 pages counting the index, the User Guide does not cover as much as the 2068 manual does (no sound synthesizer to talk about or hi-res graphics) but is packed with info in a smaller print done double column with color screen shots and boxes containing additional information. I found it much more interesting and enjoyable than the 2068 manual but cannot evaluate how a computer novice might receive it.

Many short but colorful graphics programming examples are included which should quickly build confidence in a new user and impress him that the purchase of this particular computer was a good one. Two additional books are advertised inside the back cover, entitled "Step By Step Programming" Parts I & II. They are done by the same company that produced the User Manual for Sinclair and follow the same style and format.

Also accompanying the Spectrum Plus is a cassette tape containing a ZX Spectrum Plus Keyboard Tutor on Side A and a useful user-defined graphics generator and a game (which is actually very good and uses udg's) on the back side.

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sum

Using the computer keyboard is a mixed bag. Certainly the keys are a big improvement over the original Spectrum keyboard (practically identical to the TS-1500). The keys feel wobbly when you push them since they are resting on a rubber sheet with "bubbles", but make at least as good a contact as the 2068 keys do. The extra keys on the keyboard are very welcome: dedicated arrow keys, extended mode key, and quote, edit, delete, graphics, period and comma keys. On the other hand, this keyboard suffers the same problem as the 2068 in placing your right little finger on the ENTER key when in normal position. This is one less key than standard typewriter keyboards and is still distracting to me even after 1 1/2 years of use. Making the problem of key placement more obvious is the space bar, which is only 2/3 as long as that on the 2068. As a result, a more concentrated effort has to be made to strike the space bar each time it is used--and it is the most used key in word processing. Since arrow keys are placed on either side, each missed stab results in either moving up a line or over a space! On this keyboard the BREAK key has been placed where we are used to finding the DELETE key, a real no-no. Overall, the keyboard rates about 60/40--the available dedicated keys slightly outweighing the inconvenience of the space bar and BREAK.

The Spectrum Plus key surface is 1/2" taller than the 2068's and is flat, not gently sloped as on the American machine. In order to introduce some angle, two legs at the rear of the computer can be extended to raise the rear a further 1"--

there is no intermediate position. I found both positions, flat or angled, uncomfortable, and felt that the height of the whole keyboard is too high. Those who are not touch typists and who do not do extensive word processing probably will not notice.

All the above makes it sound like the Spectrum Plus is a loser. Not so! The computer looks very elegant sitting on a desk in its all-black case and hi-tech keyboard. Loading programs can be heard thru the speaker and this computer is 100% compatible with ALL Spectrum software and hardware, including the microdrives and new Portuguese disk drive.

For those who want the ultimate in Spectrum compatibility, or are looking to replace an ailing 2068 or move up from the TS-1000 series, this may well be the answer. Most hardware and software made just for the 2068 won't work on it, and some attention will need to be given to those areas covered by Joe, particularly a monitor output, since this would allow color output without crystal swaps.

-- Richard Cravy

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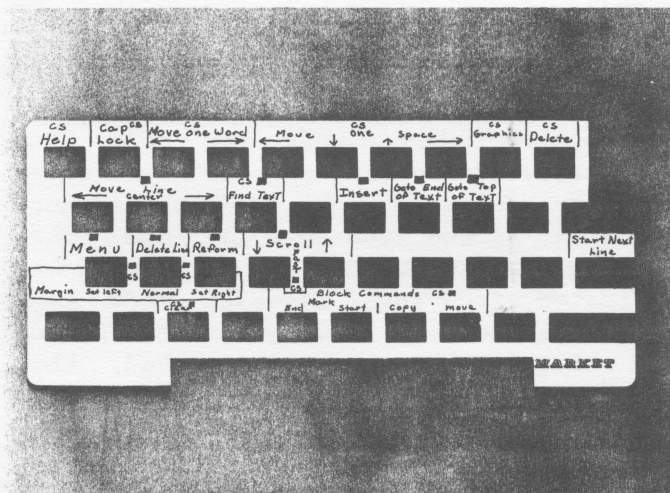
Keyboard Template for Tasword II Users

If your family is computer shy but they would like to use Tasword II, the template shown below will make their experience using the computer much more pleasant. The templates that I use were made for the Spectrum, but fit the 2068 with little alteration.

You can purchase ten blank cardboard templates from SPEEDYSOFT (formerly Software Supermarket), 87 Howard's Lane, London SW15 6NU, England. Visa/Access orders can call 01-789 8546 and order. The price comes to around \$5 including shipping.

To alter the templates for the 2068, all you have to do is cut out a slot for the enter key, right caps shift key, space bar, and ROM Switch (if you have one). To label the template, I found a black ink fine line marker worked the best. Now I don't have to keep going to the help menu when I forget a command!

--Roger Hunziker
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Latest Vendor News

A & J Microdrive has recently reduced prices on their Model 2000 stringy floppy. The system now is \$149.50 with the second drive at \$99.50. A cable and software to drive a parallel printer is now at \$24.50. Their print driver software will now LPRINT, LLIST, and COPY.

Robotron Industries Inc. is now selling an EPROM programming kit for the TS-1000. The kit comes complete with PC board, all components, and software. It will allow you to program 2716, 2732, and 2764 EPROMs. Cost is \$49.95 (power supply is extra at \$14.95). A version is also available for the TRS-80 Model III. Robotron Industries Inc. is at 1417 Wauwatosa Ave., Dept. 640, Wauwatosa, WI 53213.

Peter McMullin has just announced the release of WORD SINC II.5, a word processor for the TS-1000 series written in machine code. The package comes with documentation to drive any available Centronics printer interface. Also available is Word Font II.5 which gives you four different character sets to print out with on a dot matrix printer. For more information, contact Peter McMullin at 2340 Queen St. E., Toronto, Ontario Canada M4E 1G9.

A new BBS service called TIME\$XCHANGE is now on line with up to the minute news for the Timex/Sinclair computerist. Any TS computer with a modem will be able to log on to this service. Exchanging of messages is also supported. Contact Ed Grey at P.O. Box 2186, Inglewood, CA 90305; call 213/325-0213.

Frank Lockhart (who has an extensive background in Mechanical Design Engineering) now has available engineering and math programs which range from Belt & Chain Drives, Levers, and Pulleys \$ Wheels to Oblique Trigonometry and Weight Calculations. He also has several games and utilities. Contact him at P.O. Box 4095, Ormond Beach, FL 32075-4095; (904) 255-2514 ext. 132.

The ENGLISH MICRO CONNECTION has announced the availability of a keyboard overlay made expressly for the TS-2068 of heavy white plastic. It can be marked on and wiped off. Bob Dyl says it will be excellent for M-Script, Omnicalc, or any other software with lots of commands. Cost is \$3.00 each postpaid from EMC, 15 Kilburn Court, Newport, RI 02840.

AERCO has notified us that some misinformation has been published about their disk drive interface for the TS-2068. The price of the interface is \$199, not \$99 as mentioned in some publications. The interface includes 64K RAM, 8K ROM and an RGB output. A disk drive and power supply are extra. For more information contact Aerco, Box 18093, Austin, TX 78760; 512-451-5874.

TS CONNECTION's Jack Roberts has informed SUM that TS Connection did not buy out Timex in Little Rock nor did they take over Timex's service business. Word from Little Rock is that they are still doing repair work. Mr. Roberts says that TS Connection does do out-of-warranty repair service on the Timex computers. Prices are supposed to be reasonable and turn-around time quick. TS Connection, 3832 Watterson, Cincinnati, OH 45227; 513-271-5575.

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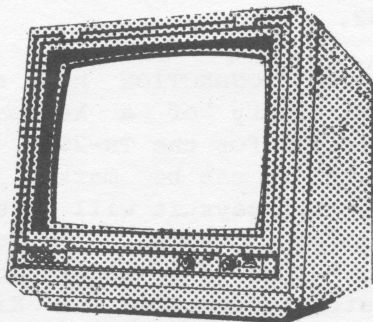
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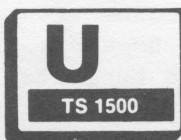
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By a stroke of very good luck, SUM has come into possession of **FOUR Composite Color Monitors** which were only used as **Dealer Demos**. These monitors are fully compatible with the Timex 2068 Computer, using the same cable presently used to feed your TV or monitor.

Our selection includes one **Texas Instruments 12"**, one **Amdek Color I 13"**, and two **NEC JB1215 Color 13"**. We have used every one and they are in perfect colorful working order. Being demos they lack their original boxes and manuals. Current retail on these monitors is over \$300 each, with even mailorder discounters asking \$220 or more.

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